Section 7. Consumption Adjustments for Calculating Expenditures

Expenditures developed in the EIA State Energy Data System (SEDS) are calculated by multiplying the price estimates by the SEDS consumption estimates. The consumption estimates are adjusted to remove process fuel, intermediate petroleum products, and other consumption that has no direct fuel costs, i.e., hydroelectric, geothermal, wind, solar and photovoltaic energy sources, and some wood and waste.

Almost all aspects of energy production, processing, and distribution consume energy as an inherent part of those activities. SEDS industrial and transportation sector consumption estimates include energy consumed in the process of providing energy to the end-use consumer and are called "process fuel." Familiar examples include energy sources used in drilling for oil and gas and transporting natural gas and petroleum by pipeline. Another "process fuel" is the energy used in generating and delivering electricity to end users. Energy products that are subsequently incorporated into another energy product for end-use consumption are called "intermediate products." Motor gasoline blending components are familiar examples of intermediate products that are consumed as part of the finished motor gasoline sold at service stations and other outlets.

Process fuel and intermediate products are not purchased by the end user and, therefore, do not have prices. Although the end user does not consume either process fuel or intermediate products directly, he does pay for them, because the cost to the processor or distributor is passed on to the end user in the price of the final end-user product. If their use was left in the consumption estimates and was assigned prices, the expenditures would be counted twice, first as paid by the "processor" (producer, processor, or transporter) and again as included in the price to the end user.

Some renewable energy sources are not purchased. These include hydroelectric, geothermal, wind, photovoltaic, and solar thermal energy. The consumption of these sources, which are measured in SEDS as kilowatthours of electricity produced, are not included in the State energy expenditure estimates since there are no "fuel costs" involved. Wood and waste can be purchased or obtained at no cost. Wood consumption estimates in the residential sector, and wood and waste in the commercial and industrial sectors are adjusted in SEDS to remove estimated quantities that were obtained at no cost.

To estimate energy expenditures in the price and expenditure tables, the consumption of process fuel, intermediate products, and some of the renewable energy sources are subtracted from the end-use sector in which they are included in SEDS, either the residential, commercial, industrial, or transportation sector, and there are no prices associated with them.

Process fuel consumption adjustments include:

1. Fuel (petroleum, natural gas, steam coal) and electricity consumed at refineries
2. Crude oil lease, plant, and pipeline fuel
3. Natural gas lease and plant fuel
4. Natural gas pipeline fuel
5. Electrical system energy losses (i.e., energy consumed in the generation, transmission, and distribution of electricity).

Intermediate product consumption adjustments include:

1. Aviation gasoline blending components
2. Motor gasoline blending components
3. Natural gasoline (1970 through 1983)
4. Pentanes plus (1984 forward)
5. Plant condensate (1970 through 1983)

6. Unfinished oils
7. Unfractionated stream (1970 through 1983).

Starting in 1984, natural gasoline (including isopentane) and plant condensate are reported together as the new product, pentanes plus, and the components of unfractionated stream are reported separately under liquefied petroleum gases.

Renewable energy consumption adjustments include:

1. Photovoltaic and solar thermal energy in the residential (including commercial) sector, industrial, and electric power sectors;
2. Geothermal energy in the residential, commercial, industrial, and electric power sectors;
3. Electricity generated from hydropower in the commercial, industrial, and electric power sectors; and
4. Electricity generated from wind energy in the electric power sector; and
5. Estimated portions of wood consumed in the residential sector, and wood and waste in the commercial and industrial sectors that were obtained at no cost.

Table TN53 shows the quantities of energy, by State, removed from SEDS consumption to calculate expenditures for 2001. State estimates for 1970 through 2001 are available in the SEDS Internet data files.

Table TN54 shows the adjustments made to SEDS national consumption estimates for 1970 through 2001 to derive the net consumption data used to calculate expenditures.

Adjustment Procedures

Refinery Fuel. Petroleum refinery consumption of distillate fuel, residual fuel, liquefied petroleum gases, petroleum coke, still gas, natural gas, steam coal, and electricity is estimated for each State and subtracted from the State's industrial sector total of each energy source.

Refineries' consumption of each fuel is available in the data sources by State or group of States (1970 through 1980) and by Petroleum Administration for Defense (PAD) districts or subdistricts (1981 forward). Where State-level data for the individual fuels are not available, they are estimated by allocating the group or district's values to the States with operating refineries within that group or district. The refining States' industrial sector consumption of each fuel is added together for each group or district to derive that group or district's industrial sector consumption subtotal. Then each State's portion of the group or district's refinery fuel consumption is calculated in proportion to its share of the group or district's industrial sector consumption subtotal.

In some cases, the estimated State refinery fuel consumption of residual fuel or LPG exceeds the estimate of the total industrial sector consumption of that fuel for that State. When this occurs, the refinery fuel consumption for the PAD district or subdistrict, group of States, or individual State is reduced until each State has positive industrial consumption. The excess refinery fuel is reallocated to a different PAD district or subdistrict, group of States or individual State as shown in Table TN55. When this adjustment involves a PAD district or subdistrict or group value, the refineries' consumption estimates for all States within the PAD district or subdistrict or group are recalcuated using these new values.

Because crude oil consumption is not an individual fuel in SEDS for 1970 through 1980, the small amounts of crude oil that were used at refineries during those years were allocated to residual and distillate fuels consumed at refineries. The allocation from crude oil refinery use to residual and distillate fuels refinery use was made according to each fuel's share of the total crude oil used directly (including losses) as residual and distillate fuels from the EIA *Petroleum Supply Annual, Volume 1,* of each year, Table 2.

Refinery consumption of still gas, excluding still gas consumed as petrochemical feedstocks, is subtracted from the SEDS industrial sector total for 1970 through 1985. Beginning in 1986, EIA data series no longer report refinery fuel and feedstock use separately, and all industrial still gas consumption is removed.

Refineries' consumption of coal by PAD district is withheld in the data sources for 1999 through 2002. Unpublished data are used for 1999 and 2000. For 2001 and 2002, the PAD district values for refinery consumption of coal is estimated by using the 2000 data to calculate the percentage of each PAD district's refinery coal consumption of the U.S. total and applying those ratios to the 2001 and 2002 values for total U.S. refinery consumption of coal.

Table TN53. Estimates of Energy Consumed as Process Fuel, Intermediate Products, and Uncosted Renewables, 2002
(Billion Btu)

State	Refinery Use							
	Distillate	Residual	LPG	Other Petroleum [a]	Natural Gas	Coal	Electricity [b]	Total
AK	124	—	19	29,028	40,095	—	221	69,487
AL	35	91	8	11,640	22,783	—	8,905	43,463
AR	47	2	9	11,309	15,552	—	4,611	31,530
AZ	—	—	—	1,124	—	—	—	1,124
CA	777	1,219	3,757	232,316	87,184	—	9,811	335,065
CO	—	—	107	9,668	11,593	—	1,944	23,313
CT	—	—	—	2,774	—	—	—	2,774
DC	—	—	—	—	—	—	—	—
DE	68	2,488	9	23,148	1,238	9	364	27,323
FL	—	—	—	6,860	—	—	—	6,860
GA	725	3,890	229	4,052	9,801	157	3,033	21,888
HI	24	2,803	101	14,168	57	—	765	17,918
IA	—	—	—	1,387	—	—	—	1,387
ID	—	—	—	—	—	—	—	—
IL	54	291	856	103,207	15,063	5	3,660	123,137
IN	44	574	155	54,884	12,303	9	4,423	72,391
KS	33	577	502	33,225	6,911	—	950	42,199
KY	39	309	532	41,457	5,552	2	4,081	51,971
LA	136	64	496	318,209	130,285	—	8,099	457,289
MA	—	—	—	3,237	—	—	—	3,237
MD	—	—	—	1,430	—	—	—	1,430
ME	—	—	—	809	—	—	—	809
MI	20	1,151	218	17,141	12,522	3	3,124	34,180
MN	37	1,775	372	36,479	4,852	2	2,004	45,521
MO	—	—	—	939	—	—	—	939
MS	37	6	13	35,917	14,036	—	4,101	54,110
MT	—	246	16	19,317	1,662	—	813	22,054
NC	—	—	—	6,927	—	—	—	6,927
ND	21	13	81	7,150	1,418	7	246	8,934
NE	—	—	—	—	—	—	—	—
NH	—	—	—	1,734	—	—	—	1,734
NJ	238	626	445	83,251	5,611	—	1,006	91,177
NM	22	6	2	12,676	12,087	—	1,451	26,245
NV	117	41	90	404	1,325	—	2,308	4,285
NY	—	—	—	13,580	—	—	—	13,580
OH	40	2,851	443	64,757	15,826	4	5,447	89,368
OK	25	1,504	235	50,449	9,433	1	1,201	62,849
OR	—	—	—	—	—	—	—	—
PA	581	2,824	175	94,367	14,964	250	4,128	117,290
RI	—	—	—	—	—	—	—	—
SC	—	—	—	396	—	—	—	396
SD	—	—	—	—	—	—	—	—
TN	16	444	123	22,070	6,426	6	2,966	32,051
TX	211	39	2,528	593,867	313,608	—	27,919	938,172
UT	—	517	23	17,927	3,434	—	1,279	23,179
VA	505	1,472	140	10,774	5,333	184	1,711	20,119
VT	—	—	—	—	—	—	—	—
WA	169	979	483	63,441	7,756	—	3,204	76,034
WI	66	2,274	218	12,070	6,960	3	2,378	23,969
WV	679	242	20	2,609	3,707	130	956	8,344
WY	—	947	13	16,157	5,035	—	1,358	23,510
US	4,893	30,266	12,421	2,088,332	804,412	772	118,468	3,059,564

See footnotes at end of table.

Table TN53. Estimates of Energy Consumed as Process Fuel, Intermediate Products, and Uncosted Renewables, 2002 (Continued)

(Billion Btu)

State	Residential		Commercial		Industrial					Transportation		
	Geothermal and Solar [c]	Wood	Geothermal and Hydro-electricity	Wood and Waste	Crude Oil Lease, Plant, and Pipeline Fuel	Natural Gas Lease and Plant Fuel	Hydro-electricity	Geothermal	Wood and Waste	Natural Gas Pipeline Fuel	Electrical System Energy Losses	Total
AK	50	1,473	36	262	—	289,582	—	—	62	4,425	46,652	412,029
AL	116	3,288	—	584	—	14,676	—	42	52,126	23,172	634,948	772,415
AR	764	1,377	—	313	—	1,502	—	21	23,518	8,274	324,476	391,774
AZ	3,202	3,346	50	612	—	60	—	228	735	20,872	478,508	508,737
CA	17,465	20,893	660	5,089	—	44,075	—	1,400	16,327	9,485	1,802,616	2,253,075
CO	327	2,770	220	492	—	43,721	—	250	190	10,940	351,131	433,353
CT	407	2,430	—	431	—	—	—	—	3,062	2,603	237,000	248,708
DC	1	453	—	80	—	—	—	—	—	248	85,066	85,848
DE	122	575	—	102	—	—	—	—	48	52	91,869	120,090
FL	30,605	2,944	643	717	—	1,413	—	—	35,410	11,311	1,608,818	1,698,722
GA	337	5,606	7	995	—	—	295	21	76,804	8,174	946,219	1,060,346
HI	1,370	—	6	—	—	—	613	2	2,137	—	79,945	101,990
IA	125	3,282	251	721	—	—	—	—	24,052	11,063	312,613	353,494
ID	62	800	541	142	—	—	—	930	6,905	6,093	158,224	173,697
IL	871	10,755	2	1,937	—	72	—	—	15,072	13,611	1,058,264	1,223,721
IN	1,013	5,618	251	3,849	—	48	—	—	18,515	4,940	775,300	881,925
KS	64	3,020	262	536	—	29,351	—	—	2,548	36,048	280,631	394,660
KY	476	2,932	262	521	—	4,102	—	—	6,855	12,370	667,050	746,540
LA	303	2,158	262	383	—	197,328	—	42	43,061	54,902	605,855	1,361,583
MA	177	4,597	287	1,163	—	—	61	—	2,724	4,439	410,530	427,212
MD	187	3,587	—	1,190	—	—	—	—	3,902	2,576	522,682	535,555
ME	114	1,149	—	1,489	—	—	9,529	—	26,722	1,108	87,455	128,374
MI	1,328	9,349	258	4,549	—	13,351	293	—	12,392	26,647	800,409	902,757
MN	522	5,544	—	1,260	—	—	460	—	14,732	23,271	475,157	566,466
MO	174	6,524	—	1,183	—	—	—	—	4,401	2,567	573,290	589,078
MS	18	1,949	272	346	—	4,942	—	42	14,169	29,154	347,425	452,427
MT	64	614	150	109	—	3,332	—	70	3,392	7,649	98,081	135,514
NC	354	5,989	86	1,063	—	—	10,809	—	24,509	6,308	937,791	993,836
ND	136	770	137	137	—	9,649	—	—	1,065	13,832	78,115	112,774
NE	93	1,931	299	373	—	295	—	—	4,152	2,614	196,148	205,905
NH	38	967	—	172	—	—	539	—	1,061	63	79,369	83,942
NJ	994	3,161	—	578	—	—	—	—	1,963	1,506	570,248	669,627
NM	369	1,173	83	208	—	74,505	—	660	255	42,089	146,814	292,402
NV	835	1,280	544	227	—	7	—	420	400	908	223,232	232,137
NY	654	22,035	281	5,692	—	860	683	—	7,955	7,866	1,127,003	1,186,608
OH	786	10,530	258	2,080	—	1,035	—	—	8,477	16,638	1,172,613	1,301,784
OK	55	1,771	—	314	—	57,547	—	—	7,398	24,069	378,257	532,259
OR	1,001	8,267	423	1,468	—	41	—	190	11,312	9,437	345,922	378,061
PA	780	4,995	251	2,494	—	6,751	—	—	17,934	39,146	1,068,755	1,258,395
RI	33	770	—	137	—	—	—	—	51	349	57,792	59,132
SC	189	2,965	3	526	—	—	—	—	23,634	3,134	594,836	625,683
SD	90	866	372	154	—	505	—	52	93	6,193	68,311	76,637
TN	101	4,095	—	1,010	—	86	6,675	—	20,725	12,406	750,874	828,023
TX	999	7,267	278	1,349	—	308,349	—	—	23,172	100,657	2,452,482	3,832,726
UT	66	1,167	177	207	—	23,074	—	400	122	6,364	177,850	232,606
VA	406	4,882	272	3,702	—	3,110	16	—	18,033	8,139	769,108	827,788
VT	39	518	—	92	—	—	163	—	923	14	43,029	44,778
WA	280	13,983	343	2,482	—	—	1,809	—	21,192	6,468	576,372	698,963
WI	347	5,137	—	1,135	—	—	2,216	—	33,887	3,833	512,129	582,654
WV	40	1,403	4	249	—	9,669	4,748	—	835	33,954	217,566	276,813
WY	5	334	652	59	—	31,587	—	19	83	13,734	98,407	168,389
US	68,951	213,289	8,883	54,964	—	1,174,627	38,908	4,787	639,090	695,713	26,503,179	32,462,012

[a] In this table, "other petroleum" consists of: still gas and petroleum coke consumed as process fuel; and aviation gasoline blending components, motor gasoline blending components, pentanes plus, and unfinished oils used as intermediate products.

[b] Electricity is converted at the rate of 3,412 Btu per kilowatthour.

[c] Includes small amounts of solar energy consumed by the commercial sector that cannot be separately identified.

—No consumption.

Source: State Energy Data System 2001.

Table TN54. Energy Consumption Adjustments, 1970 Through 2002
(Trillion Btu)

Year	Total (Gross) Consumption	Adjustments														Net Consumption
		Residential		Commercial		Industrial						Transportation				
		Geothermal and Solar [a]	Wood	Geothermal and Hydro-electricity	Wood and Waste	Refinery Use	Crude Oil Lease, Plant, and Pipeline Fuel	Natural Gas Lease and Plant Fuel	Hydro-electricity	Geothermal	Wood and Waste	Natural Gas Pipeline Fuel	Electrical System Energy Losses	Total	
1970	67,747	—	298	—	6	2,714	—	1,442	34	—	788	740	11,503	17,525	50,222
1971	69,193	—	284	—	5	2,694	—	1,456	34	—	804	761	12,103	18,140	51,053
1972	72,721	—	282	—	5	2,847	—	1,497	34	—	859	786	13,056	19,366	53,355
1973	75,778	—	263	—	5	3,010	—	1,539	35	—	900	745	13,900	20,395	55,382
1974	73,975	—	275	—	5	2,983	—	1,520	33	—	896	684	14,109	20,506	53,470
1975	72,023	—	316	—	6	2,884	—	1,434	32	—	822	595	14,341	20,430	51,593
1976	76,043	—	357	—	7	2,907	—	1,679	33	—	942	559	15,195	21,679	54,364
1977	78,028	—	402	—	8	3,008	—	1,706	33	—	989	544	15,938	22,627	55,401
1978	80,055	—	462	—	9	2,939	—	1,694	32	—	1,081	541	16,713	23,471	56,584
1979	80,926	—	543	—	10	3,078	—	1,534	34	—	1,086	613	16,922	23,819	57,107
1980	R 78,306	—	R 627	—	15	3,052	—	1,058	33	—	1,283	650	17,241	23,965	R 54,347
1981	R 76,378	—	R 651	—	R 16	2,204	—	959	33	—	1,354	660	17,230	23,095	53,272
1982	R 73,246	—	R 724	—	17	2,089	—	1,144	33	—	1,310	614	16,893	22,789	R 50,423
1983	R 73,107	—	R 722	—	R 17	2,121	140	1,010	33	—	1,480	505	17,332	23,319	R 49,746
1984	R 76,734	—	R 733	—	16	2,254	135	1,113	33	—	1,510	545	17,879	24,175	R 52,516
1985	R 76,653	—	R 755	—	18	2,046	128	1,001	33	—	1,503	521	18,270	24,193	R 52,378
1986	R 76,819	—	R 688	—	20	2,285	103	954	33	—	1,478	501	18,249	24,280	R 52,506
1987	R 79,172	—	R 634	—	22	2,485	72	1,194	33	—	1,472	538	18,679	25,129	R 54,042
1988	R 82,920	—	R 676	—	24	2,696	85	1,134	33	—	1,531	633	19,593	26,387	R 56,515
1989	R 84,987	58	R 684	3	R 73	2,710	59	1,103	28	2	684	650	R 21,010	27,032	R 57,924
1990	R 84,749	61	337	4	R 59	2,803	51	1,269	31	2	716	682	R 21,427	27,391	R 57,306
1991	R 84,664	64	R 353	4	R 60	2,668	39	1,164	30	2	685	621	R 21,621	27,250	R 57,353
1992	R 86,017	66	R 371	4	R 66	2,954	27	1,208	31	2	689	608	R 21,486	27,457	R 58,503
1993	R 87,677	68	308	4	R 68	2,878	21	1,199	30	2	R 642	643	R 22,282	28,086	R 59,531
1994	R 89,314	70	R 292	5	R 66	2,991	19	1,153	62	3	662	706	R 22,571	28,563	R 60,712
1995	R 91,261	71	R 292	6	R 66	2,915	15	1,253	55	3	445	723	R 23,363	29,205	R 62,055
1996	R 94,294	72	R 303	7	R 77	3,203	14	1,280	61	3	495	734	R 24,075	30,320	R 63,970
1997	R 94,934	72	233	7	R 80	3,196	5	1,251	58	3	R 493	781	R 24,331	30,476	R 64,423
1998	R 95,208	72	R 207	8	R 71	3,042	—	1,212	55	3	R 493	657	R 25,270	31,060	R 64,117
1999	R 96,813	72	R 218	9	R 66	3,051	—	1,103	49	4	R 495	663	R 25,856	31,457	R 65,229
2000	R 98,857	70	R 235	9	R 67	2,941	—	1,110	42	4	R 459	659	R 26,564	32,034	R 66,699
2001	R 96,369	69	R 210	9	R 52	R 3,153	—	R 1,141	R 33	5	R 456	R 642	R 25,902	31,551	R 64,696
2002	98,143	69	213	9	55	3,060	—	1,175	39	5	639	696	26,503	32,462	65,681

[a] Includes small amounts of solar energy consumed by the commercial sector that cannot be separately identified.

—No consumption.

Note: Totals may not equal sum of components due to independent rounding.

Sources: **Total (Gross) Consumption—**EIA, **State Energy Data 2001** consumption tables, http://www.eia.doe.gov/emeu/states/sep_use/total/use_tot_us.html, column titled, "Total."
Residential Geothermal and Solar—http://www.eia.doe.gov/emeu/states/sep_use/res/use_res_us.html, columns titled "Geothermal" and "Solar."
Residential Wood—State Energy Data System 2001 (SEDS).
Commercial Geothermal and Hydroelectricity—http://www.eia.doe.gov/emeu/states/sep_use/com/use_com_us.html, columns titled "Hydroelectricity" and "Geothermal."
Commercial Wood and Waste—SEDS.
Refinery Use—SEDS.
Crude Oil Lease, Plant, and Pipeline Fuel—SEDS.
Natural Gas Lease and Plant Fuel—SEDS.
Industrial Hydroelectricity—http://www.eia.doe.gov/emeu/states/sep_use/ind/use_ind_us.html, column titled, "Hydroelectric Power."
Industrial Geothermal—http://www.eia.doe.gov/emeu/states/sep_use/ind/use_ind_us.html, column titled, "Geothermal."
Industrial Wood and Waste—SEDS.
Natural Gas Pipeline Fuel—SEDS.
Electrical System Energy Losses—http://www.eia.doe.gov/emeu/states/_use_multistate.html, sum of four end-use sectors' column titled, "Electrical System Energy Losses."
Total Adjustments—SEDS.
Net Consumption—SEDS.

Table TN55. Reallocations of Excess Refinery Fuel Consumption

Year	Fuel	Thousand Barrels	Excess in:	Reallocated to:
1971	Residual Fuel	294	Kansas	Oklahoma
1973	Residual Fuel	45	Group 4: Kentucky, Tennessee	Illinois
1979	LPG	173	Montana	Wyoming
1985	Residual Fuel	212	PAD District IV	PAD District V
1986	Residual Fuel	403	PAD District IV	PAD District V
1987	Residual Fuel	497	PAD District IV	PAD District V
1988	Residual Fuel	305	PAD District IV	PAD District V
1989	Residual Fuel	381	PAD District IV	PAD District V
1990	Residual Fuel	336	PAD District IV	PAD District V
1991	Residual Fuel	378	PAD District IV	PAD District V
1992	Residual Fuel	361	PAD District IV	PAD District V
1996	Residual Fuel	184	PAD District IV	PAD District V
1997	Residual Fuel	100	PAD District IV	PAD District V
1998	Residual Fuel	82	PAD District IV	PAD District V
1999	Residual Fuel	142	PAD District IV	PAD District V
2000	Residual Fuel	224	PAD District IV	PAD District V
2001	Residual Fuel	149	PAD District IV	PAD District II
2001	Residual Fuel	95	PAD District V	PAD District II
2001	Residual Fuel	281	PAD District V	PAD District III
2002	Residual Fuel	33	PAD District V	PAD District III
2002	Residual Fuel	67	PAD District V	PAD District IV
2003	Residual Fuel	228	PAD District V	PAD District III
2004	Residual Fuel	296	PAD District V	PAD District III

Source: EIA calculations based on data from the State Energy Data System and the *Petroleum Supply Annual*.

Intermediate Products. Aviation gasoline blending components, motor gasoline blending components, natural gasoline (1970 through 1983), pentanes plus (1984 forward), plant condensate (1970 through 1983), unfinished oils, and unfractionated stream (1970 through 1983) are used at refineries and blending plants to make end-use petroleum products, particularly motor gasoline. Accordingly, consumption of these products is completely removed.

Residential Geothermal, Solar, and Wood. There are no fuel costs for geothermal, photovoltaic, and solar thermal energy sources; therefore, all consumption is removed from the expenditure calculations. Some residential wood is purchased and some acquired at no cost. Based on responses to the Form EIA-457, "1980 Residential Energy Consumption Survey," Census division percentages of wood purchased were developed and applied to the residential wood consumption in each State in the divisions in 1970 through 1989. Based on responses to the Form EIA-457, "1993 Residential Energy Consumption Survey," Census region percentages were developed and applied to the residential wood consumption of the States in each region in 1990 forward.

Commercial Geothermal, Wood, and Waste. There are no fuel costs for geothermal energy; therefore, all consumption is removed from the expenditure calculations. Some commercial wood and waste is purchased and some acquired at no cost. Conventional commercial wood acquired at no cost was estimated using the same percentages used for the residential sector. Wood and waste acquired at no cost by commercial combined heat-and-power facilities was estimated using the U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector.

Crude Oil Lease, Plant, and Pipeline Fuel. Industrial crude oil is assumed to be used as lease, plant, and pipeline fuel. Because these are process fuel uses, this crude oil is removed from SEDS industrial sector consumption.

Natural Gas Lease and Plant Fuel. Natural gas consumed as lease and plant fuel is process fuel and is subtracted from SEDS industrial sector natural gas totals by State and year.

Industrial Hydroelectricity, Geothermal, Wind, Photovoltaic, and Solar Thermal Energy. Electricity generated by industries from hydropower and geothermal, wind, photovoltaic, and solar thermal energy has no fuel cost. Operation and maintenance costs associated with these energy sources are included indirectly in the prices of the industries' products. Therefore, SEDS industrial use of these renewable sources are removed from the expenditure calculations.

Industrial Wood and Waste. The cost of wood and waste products used for energy vary widely from more expensive woods to free industrial waste products. Industrial consumption is broken into two segments, manufacturing industries and combined heat and power (CHP) facilities in order to estimate quantities received at no cost.

Adjustments to manufacturing wood and waste consumption in 1994 forward are based on information gathered on the Form EIA-846, "1994 Manufacturing Energy Survey (MECS)." Adjustments to manufacturing consumption in 1980 through 1993 are based on information gathered on the Form EIA-846, "1991 Manufacturing Energy Survey." Adjustments to industrial wood and waste consumption in 1970 through 1979 are based on the 1980 average ratios for each State. The 1991 and 1994 MECS report the quantities consumed and quantities purchased of five types of wood and waste in each of four (MECS1991) or five (MECS 1994) SIC categories of industries. The two quantity series are used to calculate SIC category average percentages of wood and waste obtained at no cost. These percentages are applied to the estimated consumption in those SIC categories in each State to estimate the State's manufacturing uncosted wood and waste.

Estimates of wood and waste obtained at no charge by industrial CHP facilities for 1989 forward are estimated using the U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector.

Each State's industrial wood and waste consumption quantities acquired at no cost are the sum of the estimated manufacturing and CHP facilities' quantities for each year.

Natural Gas Pipeline Fuel. Most of the natural gas consumed in the transportation sector of is used to power pipelines. As such, it is a process fuel and is subtracted from SEDS consumption in order to calculate expenditures.

Electrical System Energy Losses. The amount of energy lost during generation, transmission, and distribution of electricity (including plant use and unaccounted for electrical energy) is process fuel and is subtracted from sectoral energy consumption estimates used in *the Prices and Expenditures tables*. The energy losses are "paid for" when residential, commercial, industrial, and transportation sector consumers buy the electricity produced by the electric power sector.

Data Sources

Capacity of Petroleum Refineries. 1982 forward: Energy Information Administration, *Petroleum Supply Annual, Volume 1*, http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html tables titled "Number and Capacity of Operable Petroleum Refineries," columns titled, "Crude Capacity, Barrels per Calendar Day, Operating" (1982–1985), and "Atmospheric Crude Oil Distillation Capacity, Barrels per Calendar Day, Operating" (1986 forward).

1979–1981: Energy Information Administration, Energy Data Reports, *Petroleum Refineries in the United States and U.S. Territories*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

1978: Energy Information Administration, Energy Data Reports, *Petroleum Refineries in the United States and Puerto Rico*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

1970–1977: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Surveys, *Petroleum Refineries in the United States and Puerto Rico*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

Fuel Consumed at Refineries. 1981–1994, 1996, and 1998 forward: Energy Information Administration, *Petroleum Supply Annual, Volume 1*, http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html table titled "Fuels Consumed at Refineries by PAD District." Data for 1991 are from a separately published an EIA *Errata* dated November 10, 1992, GPO Stock No. 061-003-00758-9.

1995, 1997: Energy Information Administration, *Petroleum Supply Annual, Volume 1*, table titled "Fuels Consumed at Refineries by PAD District." Data for coal, electricity, and natural gas are not published and values for the previous year are repeated.

1976–1980: Energy Information Administration, Energy Data Reports, *Crude Petroleum, Petroleum Products, and Natural Gas Liquids*, table titled "Fuels Consumed for All Purposes at Refineries in the United States, by States."

1970–1975: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Surveys, *Crude Petroleum, Petroleum Products, and Natural Gas*

Liquids, table titled "Fuels Consumed for All Purposes at Refineries in the United States, by States."

1970 forward: Energy Information Administration, State Energy Data System, industrial sector consumption estimates for aviation gasoline blending components, crude oil, motor gasoline blending components, natural gasoline (1970–1983), pentanes plus (1984 forward), petroleum coke, plant condensate (1970–1983), still gas (excluding still gas consumed as petrochemical feedstocks, 1970–1985), unfinished oil, and unfractionated stream (1970–1983).

Natural Gas Lease, Plant, and Pipeline Fuel Use. 1997 forward: EIA, Natural Gas Navigator, http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm (use drop-down menu to select area, then click on icon that says "Downloadable Spreadsheet") 1997 forward: and published from 1999 forward in the EIA, *Natural Gas Annual 2003*, Tables 26 through 76.

1993–1996: EIA *Historical Natural Gas Annual 1930 Through 2000,* http://www.eia.doe.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.html Table 15.

1970–1992: EIA *Natural Gas Annual 1994, Volume II,* Table 14.

Residential Wood. 1990 forward: EIA, unpublished data from the "1993 Residential Energy Consumption Survey," Form EIA-457 http://www.eia.doe.gov/emeu/recs/contents.html.

1970–1989: EIA, unpublished data from the "1980 Residential Energy Consumption Survey," Form EIA-457.

Commercial Wood and Waste. 1990 forward: EIA, unpublished data from the "1993 Residential Energy Consumption Survey," Form EIA-457 http://www.eia.doe.gov/emeu/recs/contents.html.

1989 forward: EIA, SEDS, U.S. annual average percentages of wood (WDEISUS) and percentages of waste (WSEISUS) acquired at no cost by the electric power sector.

1970–1989: EIA, unpublished data from the "1980 Residential Energy Consumption Survey," Form EIA-457.

Industrial Wood and Waste. 1994 forward: EIA, unpublished data from the "1994 Manufacturing Energy Consumption Survey" (Form EIA-846) http://www.eia.doe.gov/emeu/mecs/contents.html.

1989 forward: EIA, SEDS, U.S. annual average percentages of wood (WDEISUS) and percentages of waste (WSEISUS) acquired at no cost by the electric power sector.

1970–1993: EIA, unpublished data from the "1991 Manufacturing Energy Consumption Survey" (Form EIA-846).